

Capasso 68-107-2-21-3-37  
Serial No. 09/883,542

### Remarks

#### Telephone Interview

The courtesy and cooperation of Examiner Nguyen in granting Applicants' attorney a telephone interview on November 5, 2003 is hereby acknowledged and gratefully appreciated.

During that interview the following issues were discussed:

- a. Applicants' attorney pointed out that claim 1, as amended in Applicants' response of June 13, 2003, explicitly calls for at least two *optical* sub-devices that have different *optical* gain/loss profiles. In contrast, the Examiner maintained that injector region 24.2 and reflector/extractor region 24.3 shown in FIG. 2 of the Capasso reference (US Patent No. 6,324,199) are optical sub-devices, whereas Applicants' attorney pointed to Col. 5, lines 1-13 of Capasso as describing that these regions are purely *electrical*. Only RT region 24.1 of Capasso can be fairly construed as being an optical sub-device.
- b. Applicants' attorney raised the possibility of amending claim 1 to more clearly point out that it is the RT regions of the claimed optical sub-devices that have different optical gain/loss profiles. Since the Examiner reacted favorably to such an amendment, claims 1 and 11 have been so amended.
- c. Applicants' attorney asked the Examiner what legal authority supports his position that the functional language of claim 1 (and other claims) should be given no patentable weight. When pressed on this issue, the Examiner indicated that he relied on 35 USC §112, paragraph 6, to support his position.

#### Amendments

Claim 1 has been amended, without prejudice, to more adequately protect Applicants' invention by indicating that the *optical* sub-devices in question *include radiative transition (RT) regions that have different optical gain/loss profiles*.

Similarly, independent claim 11 has been amended, without prejudice, to indicate that the active regions *include RT regions that are different from one another*.

No new matter has been added.

Claims 1-11 remain in the application for reconsideration.

#### No New Search Required

The amendments necessitate no new search since the fact that the optical sub-devices of claim 1 include such RT regions is explicit from original claim 10, which depends from claim 1 and states, in part, that *each of said ISB sub-devices includes a radiative transition region*. Similarly, the fact that the active regions of claim 11 include such RT regions is explicit from original claim 11, lines 5-6, which states, in part, that *each of said active regions including a plurality of radiative transition regions*. Inasmuch as the RT regions were present in the originally filed claims, any search of the as-filed application would have embraced this feature of

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the invention. Therefore, no new search is required.

### **Claim Rejections-35 USC §102**

Applicants note with appreciation that the Section 102 rejection based on the Hager reference (US Patent No. 5,126,803) has been withdrawn.

However, Claims 1-11 have been finally rejected under 35 USC §102(e) as being anticipated by Capasso *et al.*, US Patent No. 6,324,199 issued on November 27, 2001 (hereinafter *Capasso*).

### **Independent Claims 1 and 11**

The Examiner states his position as follows:

Regarding claim 1, Capasso et al discloses on figure 1 a heterogeneous intersubband optical device having a predetermined function, said device comprising a multiplicity of stacked intersubband optical sub devices 24 *characterized in that at least two of said sub-devices 24.2, 24.3 have different gain/loss profiles.* (emphasis supplied)

The limitation "said individual gain/loss profiles are mutually adapted to generate said predetermined function" is merely functional language and therefore is not given a patentable weight.

In a similar fashion, the Examiner has rejected independent claim 11.

These rejections are respectfully traversed for the reasons set forth in Applicants' response of June 13, 2003, which is incorporated herein by reference.

In the interest of brevity, however, we address here only the issue as discussed in the aforementioned telephone interview. Note, first, that the language of the final rejection omits the word *optical* as a modifier of *sub-devices 24.2, 24.3* and as modifier of *gain/loss profiles* in the *characterized in that* clause highlighted above. This omission is critical for two reasons: (i) it seems to ignore the amendment to claim 1 made in Applicants' response of June 13, 2003, and (ii) Capasso is very clear that injector region 24.2 and reflector/extractor region 24.3 are *purely electrical*, not optical. During the telephone interview, Applicants' attorney directed the Examiner's attention to column 5, lines 1-13 of Capasso and explained that the electrical function of injector region 24.2 is to inject electrons from miniband 30 into upper laser level 3 of RT region 24.1, and the electrical function of reflector/extractor region 24.3 is twofold: first, to transport electrons out of the lower laser levels 1 and 2 into miniband 34 and, second, to prevent (via minigap 36) any substantial depopulation of upper laser level 3 by tunneling into the reflector/extractor region 24.3. Only RT region 24.1 performs an optical function; that is, radiative transitions (the generation of optical radiation indicated by wavy arrow 32) take place only in the RT region 24.1.

To make this distinction ever clearer, claims 1 and 11 have been amended to indicate that the invention is characterized in that *at least two of said sub-devices include radiative transition regions that have different individual optical gain/loss profiles.* Capasso is

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totally devoid of any teaching or reasonable suggestion of at least two RT regions having different optical gain/loss profiles.

Accordingly, it is respectfully submitted that Capasso fails to anticipate claims 1 and 11. This conclusion is valid notwithstanding the Examiner's refusal to give patentable weight to certain functional language of these claims, as discussed below.

### Functional Language in Claims

In various final rejections of claims 1, 3-5, 8, and 11 under 35 USC §102, the Examiner has given no patentable weight to certain claim language, which he characterizes as *merely functional*. For example, with regard to claim 1 the Examiner makes the following summary statement:

The limitation "said individual gain/loss profiles are mutually adapted to generate said predetermined function" is *merely functional* language and therefore is not given a patentable weight. (emphasis added)

Regarding this issue, Applicants incorporate herein by reference the arguments made in their response of June 13, 2003. In addition, during the aforementioned telephone interview, Applicants' attorney asked Examiner Nguyen what legal authority supported his position. He responded that he relied on 35 USC §112, paragraph 6, which is quoted in part below:

An element in a claim for a combination *may be expressed* as a means or step for performing a specified function without the recital of structure...and such claim shall be construed to cover the corresponding structure...described in the specification and equivalents thereof. (emphasis supplied)

Applicants' attorney pointed out, however, that the language of Section 112 regarding means plus function style of claiming is *permissive, not mandatory*. Applicants are free to use functional language in other forms, which is apparent from (i) the wide variety of functional language in claims sanctioned by the Commissioner: to wit, see, for example, Capasso *et al.* US Patent Nos. 6,324,199 (claim 1, lines 21-23; the very patent relied on by the Examiner in his Section 102 rejection); 6,055,254 (claim 1, lines 46-50); and 6,400,744 (claim 1, lines 55-62); and (ii) case law that specifically states that there is *nothing intrinsically wrong* with using functional language in claim drafting. *In re Swinehart*, 169 USPQ 226 (CCPA 1971), which was cited and applied in Applicants' response of June 13, 2003.

During the aforementioned telephone interview, Applicants' attorney asked Examiner Nguyen why he did not consider the CCPA's decision in *Swinehart* to be controlling in this case. His response was that he did not have time to read the case.

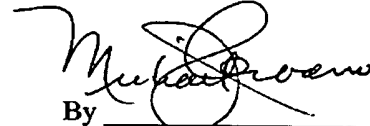
Accordingly, it is respectfully submitted that case law requires that the functional language of Applicants' claims must be given patentable weight, and 35 USC §112 does not dictate a different result.

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**Conclusion**

In view of the foregoing, reconsideration of claims 1-11, and passage of this application to issue, are hereby respectfully requested. If during the consideration of this paper, the Commissioner believes that resolution of the issues raised will be facilitated by further discussion, he is urged to contact the undersigned attorney at 610-691-7710 (voice) or 610-691-8434 (fax).

Respectfully,



By

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